WHAT IS CLAIMED IS:

1. A method of detecting a predetermined condition of a panel, comprising:

transmitting a cyclically-repeating energy wave through the material of said panel from a first location thereon to a second location thereon;

measuring the transit time of said cyclically-repeating energy wave from said first location to said second location;

and utilizing said measured transit time to detect said predetermined condition of the panel.

2. The method according to Claim 1, wherein said panel is a structural panel, and said condition to be detected is a force on, the temperature of, a deformation in, the fatigue condition of, or a fracture in said structural panel.

3. The method according to Claim 1, wherein said panel is a window panel, and said condition to be detected is the presence or absence of a force applied to said window panel, water on the window panel, or a breakage of the window panel.

4. The method according to Claim 1, wherein said panel is a floor, and said condition to be detected is the presence or absence of an object on said floor.

5. The method according to Claim 4, wherein said floor is constituted of a plurality of floor tiles; and a said cyclically-variable energy wave is transmitted through each of a plurality of said floor tiles such that each such floor tile defines an energy wave transmission channel therethrough; the transit time through each of said energy wave transmission channels being measured to thereby detect the movement of the object over said floor panel.

6. The method according to Claim 4, wherein said floor is constituted of a plurality of floor tiles; and a said cyclically-variable energy wave is transmitted through each of a plurality of said floor tiles such that each floor tile defines an energy wave transmission channel therethrough; the total transit time of all said energy wave transmission channels being measured by a common measuring circuit to thereby detect the presence of an object on any of said floor tiles.

7. The method according to Claim 1, wherein the transit time of said cyclically-repeating energy wave from said first location to said second location is an acoustical wave and is measured by:

detecting a predetermined fiducial point in the acoustical wave received at said second location;

continuously changing the frequency of transmission of the acoustical wave in accordance with the detected fiducial point of each received wave such that the number of waves received is a whole integer;

and utilizing the measured change in frequency to produce a measurement of said transit time of the acoustical wave from said first location to said second location.

8. The method according to Claim 7, wherein said panel is a touch panel, and said condition to be detected is the presence or absence of pressure applied to said touch panel.

9. The method according to Claim 8, wherein said acoustical wave is transmitted through at least two separate energy wave transmission channels in said touch panel, and a line of equal frequency through each of said transmission channels is determined and

used to determine by triangulation the location of the application of pressure to said touch panel.

10. The method according to Claim 7, wherein said panel includes a plurality of acoustical wave transmission channels each extending through a portion of the panel; each of said transmission channels including a said transmitter and receiver; the transmitters and receivers being connected in a closed loop such that the receipt of an acoustical wave in one channel triggers the transmission of an acoustical wave in the next channel of the loop, whereby the total transit times of all the channels are used to detect the predetermined condition of said panel.

11. Apparatus for detecting a predetermined condition of a panel, comprising:

a transmitter at a first location on said panel for transmitting a cyclically-repeating energy wave through the material of said panel to a second location thereon;

a receiver at said second location on said panel for receiving said cyclically-repeating energy wave;

and an electrical system designed for measuring the transit time of the cyclically-repeating energy wave from said first location to said second location and for thereby producing an indication of the condition of the panel.

12. The apparatus according to Claim 11, wherein said panel is a structural panel, and said electrical system is designed to provide an indication of a force on, the temperature of, a deformation in, a fatigue condition of, or a fracture in the structural panel.

13. The apparatus according to Claim 11, wherein said panel is a window panel, and said electrical system is designed to provide an indication of the presence or absence

of a force applied to the window panel, water on the window panel, or a breakage of the window panel.

14. The apparatus according to Claim 11, wherein said panel is a floor, and said electrical system is designed to provide an indication of the presence or absence of an object on said floor.

15. The apparatus according to Claim 14, wherein said floor is constituted of a plurality of floor tiles, and wherein each of a plurality of said floor tiles includes a transmitter and receiver for transmitting a cyclically-repeating energy wave through an energy wave transmission channel therein; said electrical system being designed to measure the transit time of the energy wave through each of said energy wave transmission channels such as to detect movement of the object over said floor.

16. The apparatus according to Claim 14, wherein said floor is constituted of a plurality of floor tiles; and a said cyclically-variable energy wave is transmitted through each of a plurality of said floor tiles such that each such floor tile defines an energy wave transmission channel there through; the total transit time of all said energy wave transmission channels being measured by a common measuring circuit to thereby detect the presence of an object on any of said floor panels.

17. The apparatus according to Claim 11, wherein said energy wave is an acoustical wave, and said electrical system measures the transit time of said acoustical wave from said first location to said second location by:

detecting a predetermined fiducial point in the acoustical wave received at said second location;

continuously changing the frequency of transmission of the acoustical wave in accordance with the detected fiducial point of each received wave such that the number of waves received is a whole integer;

and utilizing the measured change in frequency to produce a measurement of said transit time of the acoustical wave from said first location to said second location.

18. The apparatus according to Claim 17, wherein said panel is a touch panel, and said electrical system is designed to detect the presence or absence of pressure applied to said touch panel.

19. The apparatus according to Claim 18, wherein there are a plurality of transmitters and receivers defining a plurality of acoustical wave transmission channels at different locations and orientations through said touch panel; and wherein said electrical system is designed to determine a line of equal frequency through each of said acoustical wave transmission channels and to utilize said lines to determine by triangulation the location of the application of pressure to said touch panel.

20. The apparatus according to Claim 17, wherein said panel includes a plurality of acoustical wave transmission channels each extending through a portion of the panel; each of said transmission channels including a said transmitter and receiver; the transmitters and receivers being connected in a closed loop such that the receipt of an acoustical wave in one channel triggers the transmission of an acoustical wave in the next channel of the loop, whereby the total transit times of all the channels are used to detect the predetermined condition of said panel.